Amendments to the Claims:

This listing of claims will replace all prior versions and listing of claims in the application.

Listing of Claims:

1-47. (Canceled)

48.   (Currently Amended) A method for processing data in an application data store comprising:

producing at least a first snapshot of an application data store, the application data store configured to receive data by way of write operations issued from a host device;

producing a journal entry for each write operation issued from the host device;

storing each, journal entry in a journal data store, thereby accumulating a list of journal entries;

monitoring an amount of free space on the journal data store; ~~and~~

when the free space falls below a first threshold value, then removing one or more journal entries from the journal data store, thereby increasing the free space, wherein enough of the journal entries are removed so that the free space rises above a second threshold value, and

wherein each journal entry comprises a fixed-size header portion and a variable-size data portion, wherein the journal data store comprises a first storage area within which a plurality of header portions are defined and a second storage area for storing a plurality of data portions, and wherein producing a journal entry

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includes allocating one of the journal headers and allocating a sufficient amount of space in the data portion to contain data associated with the write operation.

49. (Previously Presented) The method of claim 48 wherein removing one or more journal entries includes updating the first snapshot by applying one or more journal entries to the first snapshot, beginning with an oldest journal entry, wherein journal entries applied to the first snapshot are removed from the list of journal entries thereby increasing the free space of the journal data store.

50. (Previously Presented) The method of claim 48 wherein removing one or more journal entries includes identifying a selected snapshot that is earlier in time than an oldest journal entry and is closest in time to the oldest journal entry than other snapshots and updating the selected snapshot with one or more journal entries beginning with the oldest journal entry.

51. (Previously Presented) The method of claim 48 wherein removing one or more journal entries includes looking for a most recent snapshot, removing journal entries in the journal data store that are earlier in time than the most recent snapshot.

52. (Previously Presented) The method of claim 48 wherein the first threshold

value and the second threshold value are different.

53. (Canceled)

54. (Currently Amended) The method of claim 48~~53~~ wherein storing each

journal entry includes allocating one of the journal headers from the first portion such

that the journal headers are always allocated in sequential manner and when the last

journal header is allocated then allocating journal headers from the beginning of the

first portion in sequential manner.

55. (Currently Amended) A data processing method comprising:

producing at least a first snapshot of at least a portion of an application data

store, the application data store being configured to receive write operations issued

from a host device;

recording a plurality of journal entries, each journal entry being recorded for a

write operation issued from the host device, each journal entry being stored in a

journal data store thereby consuming an amount of free space of the journal data

store; ~~and~~

updating the at least first snapshot with at least one journal entry, including

associating space consumed by the at least one journal entry with the free space

thereby increasing the free space of the journal data store,

<u>associating sequence numbers to the first snapshot and to the journal entries;</u>

<u>   receiving a target time;</u>

<u>   determining a beginning journal entry based on the sequence numbers</u>

<u>associated with the journal entries and the sequence number associated with the first</u>

<u>snapshot;</u>

<u>   updating the first snapshot by applying the beginning journal entry to it; and</u>

<u>   performing additional updates to the first snapshot by applying journal entries</u>

<u>that are subsequent in time to the beginning journal entry and prior in time to the</u>

<u>target time</u>.

56. (Previously Presented) The method of claim 55 wherein the step
of updating includes periodically monitoring the free space of the journal data store
and if the free space falls below a first threshold then updating the at least first
snapshot.

57. (Previously Presented) The method of claim 56 wherein the step of
updating the at least first snapshot is repeated for a number of journal entries so that
the free space rises above a second threshold value.

58. (Canceled)

59. (Currently Amended) ~~The method of claim 55 further comprising:~~<u>A data</u>

<u>processing method comprising:</u>

producing at least a first snapshot of at least a portion of an application data store, the application data store being configured to receive write operations issued from a host device;

recording a plurality of journal entries, each journal entry being recorded for a write operation issued from the host device, each journal entry being stored in a journal data store thereby consuming an amount of free space of the journal data store;

updating the at least first snapshot with at least one journal entry, including associating space consumed by the at least one journal entry with the free space thereby increasing the free space of the journal data store;

producing additional snapshots thereby accumulating a plurality of snapshots;

associating sequence numbers to the snapshots and to the journal entries;

receiving a target time;

determining a selected snapshot based on the target time;

determining a beginning journal entry based on the sequence numbers associated with the journal entries and the sequence number associated with the selected snapshot;

updating the selected snapshot by applying the beginning journal entry to it; and

performing additional updates to the selected snapshot by applying journal entries that are subsequent in time to the beginning journal entry and prior in time

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to the target time.

60. (Previously Presented) The method of claim 59 wherein the selected

snapshot is a first snapshot.

61. (Previously Presented) The method of claim 59 wherein the selected

snapshot is closest in time to the target time and prior in time to the target time.

62-74. (Canceled).

75. (Currently Amended) A storage system for processing data comprising:

a production data store configured to receive write operations from a host

device;

a snapshot data store configured to store one or more snapshots of at least

a portion of the production data store;

a journal data store configured to store one or more journal entries; and

a controller configured to:

access the production data store and the snapshot data store to store

one or more snapshots of at least a portion of the production data store on the

snapshot data store;

access the journal data store to record a journal entry for each write

operation from the host device; and

update one of the snapshots with some, but not all, of the journal

entries thereby leaving some journal entries for a data recovery operation,

wherein the controller is further configured to:

associate sequence numbers to the snapshots and to the journal entries;

receive a target time;

select a snapshot based on the target time;

determine a beginning journal entry based on the sequence numbers

associated with the journal entries and the sequence number of the selected

snapshot;

update the selected snapshot by applying the beginning journal entry to it;

and perform additional updates to the selected snapshot by applying journal entries

that are later in time than the beginning journal entry and earlier in time than the

target time.

76-78. (Canceled)